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**A Latent Class Analysis of Psychopathic Traits in Civil Psychiatric Patients: The Role
of criminal behaviour and victimisation**

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Abstract

This study aimed to determine whether distinct subgroups of psychopathic traits exist in a sample of civil psychiatric patients, using data from the MacArthur Violence Risk Assessment Project ($N = 810$), by means of latent class analysis. Latent class analysis was used to identify homogeneous sub-groups of psychopathic individuals. Multinomial logistic regression was used to interpret the nature of the latent classes, or groups, by estimating the associations with criminal behaviour (property and person), violence (victim of and perpetrator of), and gender. The best fitting latent class model was a four-class solution: a 'high psychopathy class' (class 1; 26.4%), an 'intermediate psychopathy class' (class 2; 16.0%), a 'low affective-interpersonal and high antisocial-lifestyle psychopathy class' (class 3; 31.3%), and a 'normative class' (class 4; 26.3%). Each of the latent classes was predicted by differing external variables. Psychopathy is not a dichotomous entity, rather it falls along a skewed continuum that is best explained by four homogenous groups that are differentially related to gender, and criminal and violent behaviour.

Keywords: Psychopathy, Latent Class Analysis, Criminal behaviour, Violence, Civil Psychiatric Patients

Introduction

Psychopathy is a clinical construct characterised by a constellation of interpersonal, affective, and behavioural characteristics that manifest in a wide-range of antisocial behaviours (Cleckley, 1941; Hare & Neumann, 2008). As measured by the Psychopathy Checklist Revised (PCL-R; Hare, 2003) and its derivatives, psychopathy has emerged as one of the most important factors in predicting and, to some extent, explaining violent and non-violent criminal behaviour (see Dhingra & Boduszek, 2013; Douglas, Vincent, & Edens, 2006; Hare & Neumann, 2008, for reviews). Indeed, Vaughn and Howard (2005) suggest that psychopathy provides an ideal conceptual framework for studying serious, violent, and chronic delinquency, while, DeLisi (2009) advanced that psychopathy is “the unified theory of delinquency and crime and the purest explanation of antisocial behaviour” (p.256).

Extensive research indicates that psychopathic offenders commit more violent and non-violent offences and have more versatile criminal careers than non-psychopathic offenders (Hare & McPherson, 1984; Moltó, Poy, & Torrubia, 2000; Salekin, Rogers, & Sewell, 1996). They also reoffend sooner, more often, and more violently while on conditional release, and perpetrate a higher degree of violence during the commission of their crimes than non-psychopathic offenders (e.g., Hart & Hare, 1997; Hemphill, Hare, & Wong, 1998; Porter, Birt & Boer, 2001; Salekin et al., 1996; Serin, 1991; Walsh & Kosson, 2008). Furthermore, when violent, psychopaths are more likely than non-psychopaths to use threats of violence and weapons (Serin, 1991).

An association between psychopathy and property crime has also been documented recently. In a sample of 124 Brazilian inmates, Flores-Mendoza, Alvarenga, Herrero, and Abad (2008) found that psychopathic offenders committed a larger number of property, fraudulent, and illegal arms carriage offenses, than non-psychopathic offenders. Moreover,

only Factor 2 (Antisocial-lifestyle traits) scores of the PCL-R were correlated with property offences, whereas only Factor 1 scores (Interpersonal-affective traits) were associated with fraud and violent crimes. Similarly, based on a sample of 132 female offenders, Warren, South, and Burnette et al. (2005) reported that offenders with convictions for property crimes had significantly higher PCL-R total and Factor 2 (Antisocial-lifestyle traits) scores than those without convictions for property crimes.

The experience of traumatic events has been shown to be associated with psychopathy. In relation to violence victimisation, several researchers (Campbell, Porter, & Santor, 2004; Lang, af Klinteberg, & Alm, 2002; Weiler & Widom, 1996) document a higher incidence of sexual and physical abuse, neglect and maltreatment among individuals with psychopathic traits. For example, one study found that individuals who had been abused, neglected, or both had significantly higher PCL-R scores than those who had not, even after controlling for differences in demographic characteristics and criminal history (Weiler & Widom, 1996). In addition, early victimisation and neglect have been identified as predictors of traits associated with psychopathy such as violence, substance abuse, sexual offending, and callousness (e.g., Hedtke, Ruggiero, & Fitzgerald et al, 2008). Porter (1996) also posits that childhood trauma may lead to the reduced affective responsiveness seen in psychopathy, as indexed by Factor 1. The causal role of environmental factors in predisposing an individual to psychopathy, however, remains controversial (Blair, Peschardt, Budhani, Mitchell, & Pine, 2006).

An increasing body of research also suggests that there may be sex differences in the behavioral expression of psychopathy (Hare, 1991). Base rates of psychopathy also appear to be lower among female than male offenders, ranging from 9% to 23% for females and 15% to 30% for males (Nicholls & Petrila, 2005; Vitale, Smith, Brinkley, & Newman, 2002). Furthermore, studies using PCL instruments (Forth, Brown, Hart, & Hare, 1996) and self-

report measures (Hare, 1991; Lilienfeld & Hess, 2001; Wilson, Frick, & Clements, 1999) report higher mean psychopathy scores for males, compared to females. However, differences between males and females are not large, and often not statistically significant (Nicholls & Petrila, 2005).

Although typically dichotomised for clinical and research purposes (i.e., someone is or is not a “psychopath”), recently support for the dimensional latent structure of psychopathy has emerged (e.g., Edens, Marcus, Lilienfeld & Poythress, 2006; Guay, Ruscio, Knight, & Hare, 2007). That is, variability in psychopathic traits across individuals reflects differences in degree (i.e., more or less psychopathic) rather than differences in kind (psychopathic versus non-psychopathic). This implies that psychopathy exists along a continuum of symptom severity within the general population and that clinical psychopathy merely represents the extreme end of the distribution (Benning, Patrick, Blonigen, Hicks, & Iacono, 2005; Hare & Neumann, 2008; Miller, Lynam, Widiger, & Leukefeld, 2001). Other research, however, strongly endorses a taxometric observed structure. For example, Harris, Skilling, and Rice (2001) asserted that psychopaths “comprise a discrete natural class of individuals” (p. 197) and that there are fundamental, qualitative differences between psychopaths and non-psychopaths.

In the present study we used latent class analysis to examine whether specific psychopathy symptoms cohere into specific, discrete latent classes of psychopathy. Interpretation of the nature of the latent classes, or groups, was based on the associations with criminal behaviour (property and crime), and violence (victimisation and perpetration), and gender. It was predicted that if quantitatively different groups were found the associations with these variables would vary as a function of class membership.

Method

Sample

As described in more detail elsewhere (Monahan, Steadman, Silver et al., 2001), participants were 1,136 civil psychiatric patients sampled from one of three acute inpatient hospitals as part of the MacArthur Violence Risk Assessment Study. Participants were included in the study if they, (a) were between the ages of 18–40, (b) spoke English as a primary language, (c) had been hospitalised for less than 21 days, and (d) had a diagnosis, based on medical records of schizophrenia, schizophreniform disorder, schizoaffective disorder, major depression, dysthymia, mania, brief reactive psychosis, delusional disorder, alcohol or other drug abuse or dependence, or a personality disorder. A total of 1,695 patients met the inclusion criteria, of whom 71% agreed to participate. Participants were administered a baseline interview in the hospital and follow-up interviews in the community at approximately 10-week intervals.

For the present study, we incorporated data from the baseline interview and two follow-up interviews. After excluding data from participants who were not administered both the Hare Psychopathy Checklist: Screening Version (PCL: SV; Hart, Cox, & Hare, 1995) and measures of violence (perpetration and victimization) and criminal behaviour, we were left with a sample of $N = 871$ (502 males and 369 females) for analysis. Participants in this sample were between the ages of 18–40 years ($M = 29.86$, $SD = 6.20$).

Measures

Psychopathy was assessed by trained raters using the 12 –items Psychopathy Checklist-Screening Version (PCL: SV; Hart et al., 1995), based on a semi-structured interview, supplemented by a review of file information. The PCL: SV was developed and validated for use in non-forensic samples and was funded in part by the MacArthur Violence Risk

Assessment Study – the source of the data for the present study. Each item is rated on a 3-point scale (0 = *does not apply*, 1 = *applies to a certain extent*, 2 = *applies*). Items were dummy coded (0, 1 = item not endorsed; 2 = item endorsed). The PCL: SV was administered to all available participants during the first or second follow-up sessions. The PCL: SV has good reliability and validity, and is strongly related to the PCL-R, both conceptually and empirically (Cooke, Michie, Hart, & Hare, 1999; Guy & Douglas, 2006). Recent research indicates that a bifactor model, including two general factors (interpersonal-affective and antisocial-lifestyle), and four method factors (interpersonal, affective, antisocial, and lifestyle) may provide the best overall fit for the PCL: SV (Boduszek & Dhingra, 2013). Total scores, can vary from 0 to 24, with scores of 13 and 18 being indicative of possible and probable psychopathy, respectively. Composite reliability of the current scale, based on the present data was $\rho_c = 0.84$ (interpersonal-affective) and $\rho_c = 0.86$ (antisocial-lifestyle).

Violence perpetration –The questions used to assess violence perpetration are referred to in the MacArthur code book as Violence Screen #1. The eight items ask whether the respondent had been aggressive/violent toward anyone in terms of: slapping, pushing, throwing something, hitting with fist/object, kicking/biting/choking, using a knife/gun, sexually abusive (tried to force someone to have sex against their will), or threatening with a weapon. The same general set of questions has shown good construct validity in other research with offenders (Michie & Cooke, 2006). A summed score (Violence perpetration) of all items was used given that they reflect a superordinate factor.

Violence victimisation – the questions used to assess violence victimisation in the present research are referred to in the MacArthur code book as Violence Screen #2. The eight items ask whether the respondent has been the victim of aggression/violence in terms of having been: slapped, pushed/grabbed/shoved, on the receiving end of something thrown at them, hit

with a fist/object, kicked/bitten/choked, injured by a knife/gun, sexually abused (tried to force them to have sex against their will), or threatened with a weapon. A summed score (Violence victimisation) of all items was used for the analysis given that they reflect a superordinate factor. The same general set of questions has shown good construct validity in other research with offenders (Michie & Cooke, 2006).

Criminal behaviour was measured by two items: (a) arrests for crimes against persons (e.g., aggravated assault, murder); and (b) arrests for crimes against property (e.g., robbery, receiving stolen property). Both items were based on Official police records of arrest(s) and were coded dichotomously.

Analysis

Latent class analysis (LCA) is a statistical method used to identify homogeneous groups (or classes) from categorical multivariate data. In current research, LCA was employed to determine the number and the nature of psychopathy risk groups based on the endorsement of each of the twelve items reflecting the latent construct of psychopathy. The twelve psychopathy items were dummy coded. Five latent class models were tested (a one- through to a five-class latent class model). Selection of the optimal number of latent classes was based on several statistical fit indices. The statistical fit indices were: Akaike information criterion (AIC), Bayesian information criterion (BIC), sample size adjusted BIC (SSABIC), the Lo-Mendell- Rubin's adjusted likelihood ratio test (LRT), and entropy measures. A non-significant LR χ^2 indicates acceptable model fit. The information statistics AIC, BIC, and SSABIC are goodness of fit measures used to compare competing models; lower observed values indicate better fit. The LRT statistic was used to compare models with differing numbers of latent classes; a non-significant value ($p > 0.05$) suggests that the model with one fewer class should be accepted. Entropy is a standardised measure of how accurately

participants are classified. Values range from 0 to 1 with higher values indicating better classification.

Multinomial logistic regression was used to assess the association between class membership (posterior probabilities from the model were used to assign individuals to a class) and criminal behaviour, being victim of violence, violence perpetration and gender. The subsequent odds ratios (OR) indicate the expected increase/decrease in the likelihood of scoring positively on a given variable compared to the reference, or control group (in this case low psychopathy risk group). The analysis was conducted using Mplus 6.12 (Muthen & Muthen, 1998– 2010).

Results

Table 1 presents the rates of endorsement for each of the twelve psychopathy items for the entire sample after list-wise deletion of missing data ($N = 871$). Table 1 shows that there is variability in endorsement rates for the items. Over half of the sample endorsed items 6 to 12 on the PCL: SV. The lowest endorsement levels (31.0-45.2%) were for items one to three, which index the affective features of psychopathy. Items assessing the interpersonal features of psychopathy (items 4, 5, and 6) were endorsed by a larger proportion of the sample (39.8-54.4%).

The fit indices for alternative latent class analyses are presented in Table 2. The 4-class solution is considered to be the best model; the information statistic (BIC) is marked lower than 1, 2, 3 and 5 class solution. Most importantly, the Lo-Mendell-Rubin's LRT indicates that the 5 class model is not significantly better than the 4 class model; therefore, the 4-class solution is preferred on the basis of parsimony. The entropy value (0.78) indicates acceptable classification of participants.

Table 1 *Prevalence rates of psychopathy items*

Item	Criteria endorsed count (%)
Interpersonal/Affective Factor	
Superficial (PCL 1)	301 (34.6)
Grandiose (PCL 2)	270 (31.0)
Manipulative (PCL 3)	394 (45.2)
Lacks remorse (PCL 4)	360 (41.3)
Lacks empathy (PCL 5)	347 (39.8)
Doesn't accept responsibility (PCL 6)	474 (54.4)
Deviant Lifestyle Factor	
Impulsive (PCL 7)	590 (67.9)
Poor behaviour controls (PCL 8)	537 (61.7)
Lacks goals (PCL 9)	673 (77.3)
Irresponsible (PCL 10)	673 (77.9)
Adolescent antisocial behaviour (PCL 11)	555 (63.9)
Adult antisocial behaviour (PCL 12)	476 (56.4)

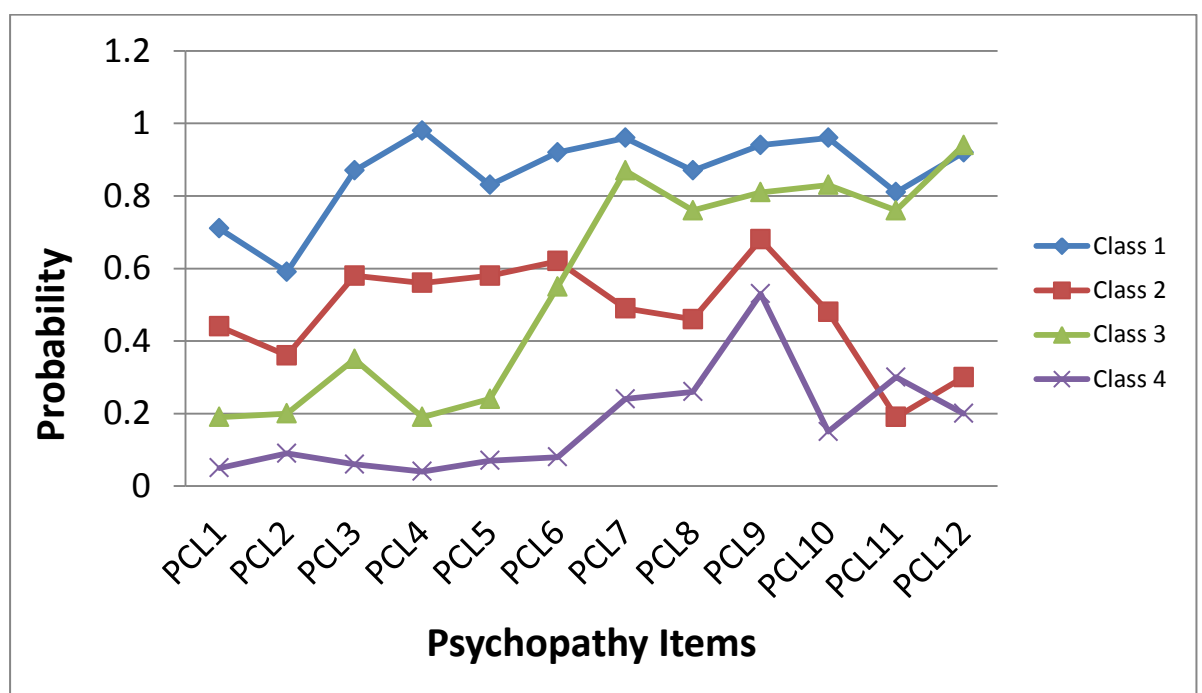
Table 2 *Fit indices for the latent class analysis of psychopathy*

Model	LR χ^2 (df)	p	AIC	BIC	SSABIC	LRT	p	Entropy
1 class	56.554 (12280)	1.00	13580.68	13637.91	13599.80	---	----	----
2 classes	131.32 (12280)	1.00	11881.51	12000.75	11921.36	1705.78	0.00	0.82
3 classes	121.87 (12280)	1.00	11536.85	11718.10	11597.42	366.49	0.02	0.78
4 classes	132.41 (12280)	1.00	11390.64	11633.89	11471.92	170.28	0.00	0.78
5 classes	124.61 (12280)	1.00	11328.53	11634.78	11430.54	87.12	0.18	0.79

Note: LR χ^2 = likelihood ratio chi-square, AIC = Akaike information criterion, BIC = Bayesian information criterion, SSABIC = sample size adjusted BIC, LRT = Lo-Mendell-Rubin's adjusted likelihood ratio test.

The latent profile plot of psychopathy is presented in Figure 1. Class 1 (26.4 % of participants) was characterised by high probability of endorsing all of the psychopathy items. This class was considered to be the high psychopathy group. Class 2 (16% of participants) was characterised by moderate probability of endorsing all psychopathy items, apart from adolescent antisocial behaviour (item PCL11 – probability of 0.19) and adult antisocial behaviour (item PCL12 – probability of 0.30). This class was considered the intermediate psychopathy group. Class 3 (31.3% of participants) was characterised by low probability of endorsement of the affective-interpersonal items (PCL1 – 6) and high probability of endorsement of the antisocial-lifestyle items (PCL7 – 12). This class was considered the low affective-interpersonal and high antisocial-lifestyle psychopathy group. Class 4 (26.3% of participants) was characterised of low probability of endorsement of all psychopathy items apart from lack of goals (item PCL 9 – probability of 0.53).

Figure 1. *Latent class profile plot of psychopathy*



A multinomial logistic regression was used to analyse the association between latent classes of psychopathy and criminal behaviour (property and person), violence (victim and perpetrator of) and gender. The reference category for the outcome variable was low level of psychopathy (class 4); each of the other three classes were compared to this reference group.

The first column in Table 3 has the outcome of low probability of endorsement of the affective-interpersonal items and high probability of endorsement of the antisocial-lifestyle items (class 3) compared to low psychopathy (reference category). The results suggest that higher levels of victimisation (OR = 1.40) and violence perpetration (OR = 1.71) significantly increase the probability of membership in class 3. Additionally, males were more likely to belong to this class (OR = 1.84). Type of offence was not statistically associated with class 3 membership.

The second column in Table 3 has the outcome of moderate psychopathy group membership (class 2) compared to reference category (class 4). Statistical analysis shows that those participants who reported higher level of violence perpetration (OR = 1.68) were significantly more likely to belong to this class while controlling for all covariates.

The third column in Table 3 has the outcome of high probability of endorsement of all psychopathy items (class 1) compared to low psychopathy group (reference category). The results indicate that higher levels of property crime (OR = 7.70), violence perpetration (OR = 1.75), and victimisation (OR = 1.55) significantly increase the probability of membership in class 1. Moreover, members of the high levels of psychopathy group were significantly more likely to be male (OR = 3.16).

Table 3 *Associations between psychopathy classes, criminal behaviour, violence and gender*

Variable	Class 3	Class 2	Class 1
	OR (95% CI)	OR (95% CI)	OR (95% CI)
Crime against property	0.84 (0.14/5.09)	0.00 (0.00/0.00)	7.70** (1.73/34.28)
Crime against person	0.37 (0.04/3.30)	0.69 (0.04/12.96)	0.97 (0.19/5.03)
Violence (victim)	1.40** (1.07/1.82)	1.24 (0.92/1.67)	1.55*** (1.21/1.99)
Violence (perpetration)	1.71** (1.18/2.48)	1.68** (1.15/2.47)	1.75** (1.21/2.54)
Gender (1 = males)	1.84* (1.09/3.10)	0.25 (0.48/1.88)	3.16*** (1.90/5.26)

Note. Reference group: low level of psychopathy, OR = Odds Ratio, 95% CI = Confidence Interval. * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$

Discussion

Results of the LCA yielded a four-class solution. The classes were labelled as ‘high’, ‘medium’, ‘low affective-interpersonal and high antisocial-lifestyle’, and ‘low’. Participants in the high psychopathy class (class 1; 26.4% of participants) had the highest probability of endorsing all items. The probabilities for the moderate psychopathy class (class 2; 16% of participants) largely mirror those of the high psychopathy class, that is, the shape of the probabilities are similar, differing mainly in the magnitude. Additionally, although the majority of probabilities in the normative class (class 4; 26.3% of participants) are near zero, those items that are moderately above zero (items 7 through to 12) follow a similar trend to that of the high and moderate classes. This pattern suggests that psychopathy is not a dichotomous entity, rather it falls along a skewed continuum on which an individual can have various levels of a characteristic. In other words, psychopathic personality is quantitatively rather than qualitatively different from normal personality. This stands in contrast to the traditional two-factor conceptualisation of the PCL: SV which does not take into account levels of expression of a characteristic or its underlying dimension (Hart et al., 1995). The low affective-interpersonal and high antisocial-lifestyle psychopathy group psychopathy class (class three; 31.3% of participants) does not, however, closely follow the same pattern as the other classes. Indeed, class 3 appears to differ qualitatively from the other classes; whereas, the other classes differ quantitatively from each other. Members of this class had a high probability of endorsing items relating to the antisocial and lifestyle traits of psychopathy and a relatively low probability of endorsing items relating to the affective and interpersonal traits of psychopathy, with the exception of items 6 (‘Does not accept responsibility’). Consequently, a compelling way to think about the psychopathy is in terms of four distinct, homogenous groups of individuals with psychopathic features.

The associations between the latent classes and external variables (criminal behaviour, violence, and gender) supports further the proposed continuum of psychopathic traits. Results indicate that the high psychopathy class had the highest odds ratios for property crime, violence victimisation, and violence perpetration, and that the odds ratios generally decreased from the high psychopathy class to the intermediate class for these variables. The increased likelihood of members of both the high and intermediate psychopathy classes having experienced violence is consistent with the growing empirical literature supporting a link between violence victimisation and psychopathy (Campbell, Porter, & Santor, 2004; Lang, af Klinteberg, & Alm, 2002; Weiler & Widom, 1996). However, as in previous research, it can only be assumed that victimisation experiences preceded the emergence of psychopathic traits, as it is not possible to determine from the present data when victimisation occurred.

Exploration of the varying experiences of violence across the psychopathy classes, as identified in the present study, represents an important direction for future research, and could be gained from a thorough assessment of childhood and adult violent experiences. Future research should also seek to determine if these non-baseline psychopathy latent classes are evident in other populations (e.g., prisoners, adolescents). Moreover, evidence of four latent classes suggests that psychopathy is unlikely to result from a single dichotomous causal factor. Consequently, research is needed to determine if the three psychopathy classes have different aetiologies and may respond to treatment modalities in a way that would make their differentiation clinically relevant. Given the varying external variables that predicted group membership, the combining of such homogenous groups in research is likely to have a negative impact on the clarity of research results.

The results of the present study should be interpreted in light of several important limitations, some of which point towards important directions for future research. First, the

data that were analysed were cross-sectional. Consequently, no causal assertions can be made regarding the relationships that were found. Second, the current analysis was based on data collected from civil psychiatric patients, and, therefore, these results may not be widely generalizable. Future research should focus on replicating these findings with different populations (i.e., forensic, criminal, adolescents) in order to determine the stability and cross-cultural consistency of the results. Finally, violence victimization was assessed using single binary response items without behavioural descriptors which may have led to significant underreporting. However, whilst retrospective self-reports of violent experiences, especially from individuals experiencing mental health difficulties, represents one potential methodological problem, previous research indicates that such reports are typically reliable (Read et al., 2005).

In conclusion, this study has shown that the psychopathy continuum may be best conceptualised as containing four discrete latent classes ranging from a low psychopathy class through to a high psychopathy class. Movement along these classes is generally associated with more severe psychopathy symptoms and greater criminal and violent behaviour.

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